

SVKM's
D. J. Sanghvi College of Engineering

**Program: B.Tech in Information
Technology**

Academic Year: 2022

Duration: 3 hours

Date: 27.01.2023

Time: 09:00 am to 12:00 pm

Subject: Operating System (Semester III)

Marks: 75

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.

- (1) This question paper contains two pages.
- (2) **All Questions are Compulsory.**
- (3) All questions carry equal marks.
- (4) **Answer to each new question is to be started on a fresh page.**
- (5) **Figures in the brackets on the right indicate full marks.**
- (6) **Assume suitable data wherever required, but justify it.**
- (7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max.Marks															
Q1 (a)	Explain process management in detail. OR Write a short note on Polling	[05] [05]															
Q1 (b)	Consider the processes P1, P2, P3, P4 given in below table, arrives for execution, given Burst Time and Arrival Time. Draw the Gantt chart and find the average waiting time using the FCFS and SJF(Non-Pre-emptive) scheduling algorithm. <table border="1"><thead><tr><th>Process</th><th>Burst Time</th><th>Arrival Time</th></tr></thead><tbody><tr><td>P1</td><td>21</td><td>1</td></tr><tr><td>P2</td><td>3</td><td>0</td></tr><tr><td>P3</td><td>6</td><td>2</td></tr><tr><td>P4</td><td>2</td><td>3</td></tr></tbody></table>	Process	Burst Time	Arrival Time	P1	21	1	P2	3	0	P3	6	2	P4	2	3	[10]
Process	Burst Time	Arrival Time															
P1	21	1															
P2	3	0															
P3	6	2															
P4	2	3															
Q2 (a)	Discuss critical section problem. What are the minimum requirements that should be satisfied by a solution to critical section problem. Discuss the Peterson solution for the same.	[10]															
Q2 (b)	Differentiate between short term and medium term scheduler. OR Differentiate between RAID level 2 and RAID 3.	[05] [05]															

Q3 (a)	Suppose that a disk drive has 51 cylinders, numbered 0 to 50. The drive is currently serving a request at cylinder 11. The queue of pending requests in FIFO 1, 36, 16, 34, 9, 12. What is the total distance that the disk arm moves and show the tracing of the requests by applying following algorithms: SSTF, SCAN, C-SCAN, C-LOOK(Initially head is moving towards right)	[10]
Q3 (b)	Discuss tree directory structure with advantages of it. OR Explain any two file access methods with suitable examples.	[05] [05]
Q4 (a)	Consider the following page reference string 1, 2,3,4,5,2,6,7,3,2,4,1,7,1,4,3,2,3,4,7,1. Compare the number of page faults with frame sizes 3 and 4 with LRU replacement algorithm. OR Given free memory partitions of 100 K, 500 K, 200 K, 300 K, and 600 K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212 K, 417 K, 112 K, and 426 K (in order). Evaluate, which algorithm makes most efficient use of memory?	[10] [10]
Q4 (b)	Differentiate between Inter-process communication using Message Passing and Shared Memory Model OR Illustrate How to overcome busy waiting using Semaphore operations	[05] [05]
Q5 (a)	What is a deadlock? Consider the deadlock situation that could occur in the dining philosopher's problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. What is the solution for this problem?	[10]
Q5 (b)	Differentiate between fixed and variable partitioning scheme of memory allocation. OR Differentiate between swapping and demand paging.	[05] [05]